Remarks

Claims 1-27 have been cancelled and claims 28-37 remain in the application. Claim 28 has been amended to recite:

> (a) a metal tubular-shaped container having an inside surface and having a layer of electrically insulating material on said inside surface ~~layer~~, said layer having a thickness in the range of 10 to 500 mils, said tubular container having an upper portion and a lower portion;
>
> (d) an electric current feed conductor extending through said powdered media to a second electric current conduction means contacting said lower portion of said powdered media to permit electric current to flow from said first means through said powdered media to said second means, the electric current feed conductor having a layer of electrically insulating material on the surface thereof to prevent electrical short circuiting, the electrical resistivity of said media generating heat upon flow of said electric current.

In the Office Action, claims 1, 4, 5, 8, 10, 13, 14, 17, 19, 22, 23, 28, 31, 32, 35 and 37 were rejected under 35 U.S.C. §102.(b) as being anticipated by Lorch et al (U.S. Patent 2,905,919). Claims 2, 3, 9, 18, 20, 21, 27, 33, 34 and 36 were rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as above over Lorch et al.

It is respectfully submitted that claims 28-37 are patentable over Lorch et al, taken singly or in combination with Kohn. Lorch discloses electric heating cables as follows:

> This invention relates to electric cables for use, in long or short lengths, as electric heaters. The cable in accordance with this invention comprises at least two conductors separated from one another by semi-conducting inorganic material, the whole being enclosed within a surrounding layer of ***pulverulent mineral insulating material*** and an outer metal sheath. The insulating material may be, for instance, magnesium oxide or talc. (Emphasis added.)

At col. 2, lines 1-15, Lorch discloses that the cables are made by rolling, swaging, or drawing, as follows:

> The cables may be made by assembling the metal components in relatively short lengths of increased cross-sectional area in the appropriate relationship and filling the intermediate spaces with the appropriate semi-conductive and insulating compositions, usually in the form of dry powders. After filling, the complete structure is then reduced to the required cross-sectional dimensions by rolling, swaging or drawing or any combination of these operations, with or without drying and annealing stages. Alternatively one or both of the non-metallic components may be applied by extrusion in the form of paste which is afterwards dried, or with some constructions both may be so applied either simultaneously or consecutively, with or without a final drawing down to consolidate the non-metallic layers.

It should be noted that Applicant's invention is not concerned with rolling, swaging or drawing the heater.

Further, Lorch discloses that the cable comprises a tubular copper conductor 3 which is concentric with a central copper wire 4 (col. 2, lines 33-41), as follows:

> Referring first of all to Figure 1, there is shown a circular section copper tube 1, which constitutes an outer sheath, fitting closely on an annular insulating body 2 of ***pulverulent*** magnesium oxide. The annular insulating body 2 encloses a tubular copper conductor 3, which is of circular section and is concentric with a central copper conductor wire 4, the wire 4 and tubular conductor 3 being separated from one another by a filling of semi-conductive material 5. (Emphasis added.)

It will be noted that Lorch requires a "layer of ***pulverulent*** mineral insulating material" or "an annular insulating body 2 of ***pulverulent*** magnesium oxide". It is noted at col. 2, lines 55-56 that "the annular space within the tube is packed with the ***pulverulent*** insulating material 2."

Applicant's invention does not use or even disclose a "pulverulent insulating material". Instead, Applicant discloses and claims a tubular heater having a layer of electrically insulating material having a thickness in the range of 10 to 500 mils provided on the inside surface of the tubular container. Applicant teaches in the specification that an electrical insulating layer is required to prevent short circuiting of the heater, as follows:

> **[0038]** When tube 42 is comprised of a metal layer 46, then electrical insulating layer 44 is required on the inside surface to prevent the heater from short circuiting. Any high thermal conductivity electrical insulating layer, which electrically isolates the metal from the heating element, may be used. Typical electrical insulating layers are comprised of alumina, magnesia, mullite, silicon carbide, silicon nitride and SiAlON. These layers may be applied by casting in-place, spray deposition, or mechanical insertion of a pre-cast or extruded form. Such layers usually have a total thickness in the range of 10 to 500 mils.

It should be noted that "pulverulent insulating material", because of its inherent thickness, teaches away from Applicant's invention. That is, in Applicant's invention, it is desired to have a very thin electrical insulating material for good heat transfer. Lorch is not concerned with high heat transfer because of the use of the pulverulent insulation.

It is respectfully submitted that Applicant's invention is patentable over Lorch for another reason. That is, Lorch used a different construction than Applicant. In Lorch, both conductors are bare and the central conductor 3 is placed centrally within the tubular conductor 4, as noted at col. 2, lines 45-49, as follows:

> In this process, a circular section copper rod which is to comprise the central conductor 4, is placed centrally within, and in fixed relation to, a circular section copper tube which is to provide the tubular conductor 3.

Thus, the electric current would flow in a radial direction from the central conductor 3 to the tubular conductor 4. By distinction, in Applicant's invention, the electric current is not transferred along an outer tube. In Applicant's invention, the electric current is transferred from one end of the heater tube, through the powdered media, to the opposite end. Clearly, Lorch is ***silent*** with respect to such a heater. It will be seen in Lorch that the copper tube 4 and the central conductor 3 transfer the electric current to the powdered media. In Applicant's invention, the tube is insulated to be electrically nonconductive and does not carry electric current. Further, in Applicant's invention, the central conductor is provided with an electrical nonconductive coating to avoid electrical short-circuiting to the powdered media. Clearly, it will be seen for these reasons that Applicant's invention

is entirely different from that disclosed in Lorch and therefore is not anticipated by or made obvious by Lorch.

Applicant's invention is different from Lorch in yet another way. Lorch employs a tubular copper conductor 3. Applicant does not use or disclose a heater assembly having a tubular conductor such as disclosed in Lorch. Thus, because these are different inventions, Applicant's invention cannot be anticipated or made obvious by Lorch.

Applicant's invention is patentable over Lorch for yet another reason. That is, Applicant employs an electric current feed conductor having a layer of electrical insulating material, the conductor extending through the powdered media to a second electrical conduction means. No such construction is shown or disclosed in Lorch. Thus, for this additional reason, Applicant's invention is patentable over Lorch.

Claims 29-37 are patentable for the reasons set forth above. Claims 29 and 30 are patentable over Lorch for the additional reasons that they require the powdered media to have a resistivity in the range of 5 to 75 Ω and 10 to 55 Ω, respectively. Claim 31 is patentable over Lorch for the additional reason that it requires a powdered media comprising a powder selected from the group consisting of SiC, C, Mo, W, TiO2, Si_3N_4, SiO2 and BN. Claim 32 is patentable over Lorch for the additional reason that it requires a powdered media that comprises a mixture of an electrical conductive powder and an electrical non-conductive powder. Claim 33 is patentable over Lorch for the additional reason that it requires powdered media comprising a mixture of carbon powder and a powder selected from the group consisting of SiC, TiO_2, Si_3N_4, SiO_2 and BN. Claim 34 is patentable over Lorch for the additional reason that it requires powdered media comprising a mixture of carbon and SiC powder. Claim 35 is patentable over Lorch for the additional reason that it requires a powdered media having a melting point in the range of 800° to 4000°C. Claim 36 is patentable over Lorch for the additional reason that it requires a powdered media having an average particle size in the range of 5 to 3000 microns. Claim 37 is patentable over Lorch for the additional reason that it requires an

electrically insulating inside surface layer comprised of alumina, magnesia, mullite, silicon carbide, silicon nitride or SiAlON.

Applicant's invention as set forth in amended claim 28 is patentable over Kohn taken singly or combined with Lorch. Kohn discloses a resistor which uses "an oxidizable compound usually, but not necessarily, of a graphitic nature, as resistors in a deoxidizing or reducing atmosphere". Further, the resistor employs a casing comprised of carborundum and graphite, which is thick, to prevent passing of gases (see col. 2, lines 96-104). Thus, it will be seen that Kohn does not employ a metal tube or conductors having thin electrical insulating coatings as in Applicant's invention and noted above with respect to Lorch. Thus, Applicant's invention is patentable over Kohn taken singly or combined with Lorch.

Claims 29-37 are patentable over Kohn for the reasons set forth above. Claims 29 and 30 are patentable over Kohn for the additional reasons that they require the powdered media to have a resistivity in the range of 5 to 75 Ω and 10 to 55 Ω, respectively. Claim 31 is patentable over Kohn for the additional reason that it requires a powdered media comprising a powder selected from the group consisting of SiC, C, Mo, W, TiO2, Si_3N_4, SiO2 and BN. Claim 32 is patentable over Kohn for the additional reason that it requires a powdered media that comprises a mixture of an electrical conductive powder and an electrical non-conductive powder. Claim 33 is patentable over Kohn for the additional reason that it requires powdered media comprising a mixture of carbon powder and a powder selected from the group consisting of SiC, TiO_2, Si_3N_4, SiO_2 and BN. Claim 34 is patentable over Kohn for the additional reason that it requires powdered media comprising a mixture of carbon and SiC powder. Claim 35 is patentable over Kohn for the additional reason that it requires a powdered media having a melting point in the range of 800° to 4000°C. Claim 36 is patentable over Kohn for the additional reason that it requires a powdered media having an average particle size in the range of 5 to 3000 microns. Claim 37 is patentable over Kohn for the additional reason that it

requires an electrically insulating inside surface layer comprised of alumina, magnesia, mullite, silicon carbide, silicon nitride or SiAlON.

In view of the above amendments and remarks, it will be noted that a sincere attempt has been made to place this application in condition for allowance. Therefore, reexamination and reconsideration are requested and allowance solicited at an early date.

Respectfully submitted,

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